Spring 2020

CHEM 125-006: General Chemistry I

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NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

CHEM 125 (DAY):
Spring 2020 Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Chemistry & Environmental Science (CES) takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

Course Description: Chem 125

Number of Credits: 3

Corequisites: Math 110 or equivalent

Course-Section and Instructors

Course-Section	Instructor
Chem 125:	Various

Office Hours:

Required Textbook:

Title	Chemistry, A Molecular Approach
Author	Nivaldo J. Tro
Edition	Fifth
Publisher	Pearson
ISBN #	ISBN-13: 978-0134874371

University-wide Withdrawal Date: The last day to withdraw with a **W** is Monday, November 11, 2019. It will be strictly enforced.

Learning Outcomes:

1. **Learn measurement units and perform unit conversions systematically using dimensional analysis or multiplication by one**
2. **Explain atomic structure and determine average atomic mass.**
3. **Learn to use periodic table to predict charges on atoms.**
4. **Understand mole concept: convert mass into moles and vice versa**
5. **Write chemical formulas of compounds using the periodic table and name ions and simple compounds.**
6. **Calculate mass of molecules, and mass % of individual atoms in compounds**
7. **Calculate moles, molecular and empirical formula of a compound from basic principles using proper unit conversions**
8. **Balance chemical equations**
9. **Identify various types of chemical reactions and apply the concept of limiting reagent to calculate percentage yield of products in different reaction types.**
10. **Define solute, solvent and apply mole concept in aqueous solutions.**
11. **Determine oxidation states of elements in compounds**
12. **Describe acid-base, precipitation and redox reactions in solution**
13. **Understand Kinetic model of gases and apply various gas laws in problem solving.**
14. **Apply first law of thermodynamics to chemical problems and calculate the energy changes in chemical reactions**
15. **Explain the quantum mechanical basis for the sub-structure of the atom**
16. **Write the electronic configuration for the elements in the periodic table and describe trends in periodic properties**
17. **Draw the Lewis dot structures for simple molecules and exceptions to octet rule**
18. **Discuss electronegativity and bond polarity**
19. **Use VSEPR to predict shapes of molecules and whether a molecule will have a dipole moment**
20. **Identify sigma and pi bonds and explain the hybridization of the molecules**
21. **Explain intermolecular force and the differences in bonding patterns between solids liquids and gases**
22. **Describe differences in basic crystalline shapes**
23. **Determine edge length and density of simple crystalline shapes.**
24. **Predict changes in freezing point, elevation in boiling point and osmotic pressure when a solute dissolves in a pure solvent**

POLICIES

All CES students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly.
In addition, obtaining course materials such as past exams or solutions to homework and/or class assignments from external sources constitutes as cheating. The official Student's Solutions Guide is exempt. Posting of course materials on external websites without the approval of the instructor violates intellectual property laws and hence strictly forbidden. Any student caught cheating on homework will be assessed a penalty of 20 points, in addition to a grade of zero for the given homework assignment.
Students are encouraged to seek help from their Instructors during office hours.

Grading Policy: The final grade in this course will be determined by a point total based on the following:

Homework (Basic HW: 60 + Regular HW 100) points	160
Class Participation (recitation + lecture)	190
Common Exam I	125
Common Exam II	125
Common Exam III	125
Final Exam	275

Total points	1000

Your final letter grade in this course will be based on the following tentative curve:

A	>835	**C**	600-659
B+	775-834	**D**	550-599
B	710-774	**F**	< 550
C+	660-709		

You must maintain an average of 35%, which is 228 points in the common exams and finals to be considered for a grade of D or higher. You will receive an F even if you have adequate point total without this requirement.

Attendance Policy: Attendance at classes will be recorded and is **mandatory**. Each class is a learning experience that cannot be replicated through simply "getting the notes."

Lecture: An I-clicker and calculator are required for all lectures. If your iclicker malfunctions, you are required to inform the instructor, either in person or via e-mail the **same day**. Failure to notify the instructor will result in loss of points for that day. If you are in class, but using a cell phone in any way, using a computer, or listening to music you will not get credit for that day's attendance. If you are cheating (having a second I-clicker) you and the person for whom you are cheating will get 0 for the entire semester. There are ways to check! So, be honest.

Recitation: Students are expected to come to recitation after having reviewed the class lecture notes. Each recitation, the students will be given a worksheet to solve. The worksheets are collected at the end of the recitation and graded. Students who did not succeed in completing the worksheet during the recitation have one week time to complete the worksheets during office hours. Students who miss a recitation for a valid reason must still make up the worksheet to get credit.

Homework Policy: There are two types of homework: Basic and Regular.

Basic Homework, worth 60 points: It is recommended that you do the basic HW for the chapter before coming to the lecture. This homework is intended as a preparation for your participation in class. Getting > 70% in the basic homework before the lecture, will ensure you have the foundation necessary to understand what is being taught in class.

Regular homework, worth 100 points: This homework is to test your understanding of the material being taught. This homework will build on the classroom content and enhance your understanding of the material. This homework will also be good preparation for the common exams.

All homework is very important. However, it is absolutely important that you aim to get > 90% in the basic and >70% in the regular HW to help you pass this class.

Each homework assignment has it due date. In addition, Moodle has a calendar with due dates. **ALL HOMEWORK MUST BE DONE ON TIME. There is no credit for late homework.** DO NOT WAIT TO THE LAST MINUTE TO DO YOUR HOMEWORK. ONLINE SYSTEMS ARE NOT 100% RELIABLE AND UNEXPECTED EVENTS MAY OCCUR. IN GENERAL, THERE IS NO LATE HOMEWORK AND MOODLE BEING DOWN IS NOT A VALID EXCUSE. PLAN TO FINISH YOUR HOMEWORK AT LEAST ONE DAY BEFORE IT IS DUE.

Exams: There will be three midterm exams held in class during the semester and one comprehensive final exam. The following exam periods are tentative and therefore possibly subject to change:

Common Exam I	**Monday 4:30 - 5:45pm - 2/17/2020**
Common Exam II	**Monday 4:30 - 5:45pm - 3/23/2020**
Common Exam III	**Monday 4:30 - 5:45pm - 4/20/2020**
Reading Days	**May 6th and May 7th**
Final Exam Period	**May 8th - May 14th**

The final exam will test your knowledge of all the course material taught in the entire course.

TEST GRADING ERROR. Tests are returned in recitations following the test. If you believe there is an error, you have until the Thursday following the test to submit a test for regrading. You must write a very brief description of the problem on the back of the test. (The answer key is provided in Moodle in the TEST INFORMATION book. You should always learn from your mistakes and go over the answer key.)
ALL ERRORS NEED TO BE BROUGHT TO THE INSTRUCTOR'S ATTENTION WHEN THEY OCCUR. DO NOT WAIT UNTIL THE END OF THE SEMESTER

Makeup Exam Policy: There will normally be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event that a student has a legitimate reason for missing a quiz or exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor that the exam will be missed. **One *cumulative make-up examination*** will be permitted at the end of the semester if there is an acceptable and substantial reason. A grade of zero will be given for a second missed examination independent of reason. ***Tentative date of the makeup exam is on May 1st at 7.00 am.***

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times. Such devices must be stowed in bags during exams or quizzes.

ADDITIONAL RESOURCES

Chemistry Tutoring Center: Located in the Central King Building, Lower Level, Rm. G12. Students can get help from peer tutors on a "walk-in" basis. There is no private tutoring available, however if the center is not too busy, you may be able to get more personal attention. In this peer tutoring model, tutors are taught to encourage interaction among students to promote learning.

Hours of operation are Monday – Friday 10:00 am - 6:00 pm. For further information please click here.

Accommodation of Disabilities: Office of Accessibility Resources and Services (***formerly known as Disability Support Services***) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:

- http://www5.njit.edu/studentsuccess/disability-support-services/

Important Dates (See: Spring 2020 Academic Calendar, Registrar)

Date	Day	Event
January 21, 20220	T	First Day of Classes
January 31, 2020	F	Last Day to Add/Drop Classes
March 15-22, 2020		Spring Recess
April 6, 2020	M	Last Day to Withdraw
April 10, 2020	F	Good Friday, no classes
November 27, 2019	W	Friday Classes Meet
May 5th 2020	T	Friday classes meet
May 5th 2020	T	Last Day of Classes
May 6th and May 7th	W-Thu	Reading Days

Course Outline

Week	Outcomes	Topic	Homework
1	1	Chapter 1: Matter, Measurement and problem solving	Warm up Basic HW Basic HW I: Sig Figs Basic HW II: Unit Conversion Regular HW
2	2,3,4	Chapter 2: Atoms and Elements	Basic HW Regular HW
3	4,5,6,7	Chapter 3: Molecules and Compounds	Basic HW Regular HW
		EXAM 1: Chapters 1-3	
4	8,9	Chapter 4: Chemical Reactions and Chemical Quantities	Basic HW : Regular HW I: Reaction Stoichiometry Regular HW II% yield
5	10, 11, 12	Chapter 5: Introduction to Solutions and Aqueous Reactions	Basic HW Regular HW
5	13	Chapter 6: Gases	Basic HW Regular HW
6	14	Chapter 7: Thermochemistry	Basic HW Regular HW
		EXAM 2: Chapters 4-7	
7	15	Chapter 8: The Quantum Mechanical Model of the Atom	Basic HW Regular HW
8	16,17	Chapter 9: Periodic Properties of the Elements	Basic HW Regular HW
9	17, 18, 19	Chapter 10: Chemical Bonding I: The Lewis Model	Basic HW Regular HW
10	18, 19, 20	Chapter 11: Molecular shapes, Valence Bond Theory and Molecular Orbital Theory8	Basic HW Regular HW I Regular HW II
		EXAM 3: Chapters 7-11	
11	21	Chapter 12: Liquids, Solids and Intermolecular Forces	Basic HW Regular HW
12	22, 23	Chapter 13: Solids and Modern Materials	Basic HW
13	24	Chapter 14: Solutions	Basic HW Regular HW Class quiz- chapters 12-14

14	1 - 20	**FINAL EXAM Review**	Basic: Chapters 1-8 Basic Chapters 9-12 ACS reviews: 1-6